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Amlan Datta

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EXAMINER

DEGHAN, QUEENIE S

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/648,585	<b>Applicant(s)</b> DATTA ET AL.	
	<b>Examiner</b> Queenie Dehghan	<b>Art Unit</b> 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 July 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/11/08</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 16 recites dependency on two claims.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. Claims 1-2, 6, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsubara et al. (2002/0004111). Matsubara disclose a method of forming synthetic microspheres, comprising providing an agglomerate precursor, wherein the agglomerate precursor comprises at least one aluminosilicate material and at least one binding agent, such as boric acid, wherein the agglomerate precursor has an alkali metal oxide content of less than about 10 wt. % based on the weight of the precursor ([0061], [0068],[0075]). Matsubara teaches a microsphere formulation that contains substantially no alkali metal ([0001]). Matsubara also disclose firing the precursor at a pre-determined temperature profile sufficient to combine the aluminosilicate materials with the binding agent so as to form a microsphere having a substantially spherical wall, a substantial void volume ([0002], [0063]-[0064]). Although Matsubara discloses a

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desire for an average particle diameter of about 30 microns, obtaining an average particle diameter of greater than 30 microns is not novel or unobvious. Matsubara teaches other prior arts wherein an average particle diameter of 50 microns or 70 microns are known ([0005]-[0007]). Matsubara also teaches particle sizes can be controlled by several variables such as the viscosity of the slurry, a more viscous slurry results in an agglomeration and larger particle sizes, the gas pressure for forming the droplets, lower pressure results in larger particle sizes and classification or sieving ([0045], [0047], [0056]). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to expect Matsubara to have similar formed particles with an average diameter greater than 30 microns, as Matsubara has demonstrated some known factors for controlling for determining the size of the final particles.

2. Regarding claim 2, the firing temperature was 1500°C ([0063]).
3. Regarding claim 6, Matsubara discloses a fuel fired furnace ([0063]).
4. Regarding claim 8, Matsubara discloses a blowing agent and activating the blowing agent during the firing step so as to release a blowing gas, thereby forming at least one substantially enclosed void in the precursor ([0033]-[0037], [0051]).
5. Claims 5, 8, 9, 11-15, 17-20 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsubara et al. (2002/0004111) in view of Matthews et al. (3,838,998). Regarding claims 5, 8, 9, 11-15, 18-20, in addition to what was covered in claim 1 above, Matsubara teaches using other known glass starting materials such as natural volcanic material ([0036]) and a brief summary of use of a blowing agent, but fail to present more detail method steps regarding the blowing agent and drying steps.

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Matthews et al. also disclose a process for forming aluminosilicate microspheres comprising forming an agglomerate precursor comprising aluminosilicate glasses (col. 4 line 37) from feldspar (another natural source for glass) and a binding agent, drying the precursor mixture (col. 7 lines 40-53) to a first moisture level (col. 8 lines 26-28) of less than about 14% (note the range 5 to 15% is less than about 14% in col. 8 lines 13-14), firing of the precursor to a temperature (col. 10 lines 23-24) sufficient to react the binding agent to form a microsphere having a spherical wall (col. 10 lines 3-6, 44-46) in a heated vertical pipe (col. 9 lines 46-47), and rapidly cooling the microspheres after the firing step (col. 11 lines 39-40). The binding agent glassifies at lower temperatures and creates a molten skin around the precursor and interior void of the microsphere (col. 10 lines 3-6, 37-45). Furthermore, Matthews et al. disclose using a blowing agent in the precursor material (col. 5 lines 65-68 to col. 6 lines 1-2) that is activated during the firing step and after the formation of the molten skin (col. 12 lines 51-56) so as to trap the blowing gas, such as CO<sub>2</sub> and H<sub>2</sub>O (col. 6 lines 9-11) inside the molten skin (col. 5 lines 52-53) and release a blowing gas to expand the precursor and forming an enclosed void in the precursor (col. 5 lines 54-57, col. 10 lines 37-45), hence forming microspheres.

6. As mentioned by Matsubara, other known sources for glass starting material can be utilized, as demonstrated by Matthews. Furthermore, since the precursor of Matsubara and Matthews comprises similar elements such a glass starting material comprising aluminosilicate components, a binder and a blowing agent, and the firing of the precursor to form hollow microspheres, it would have been obvious to one of ordinary skill in the art at the time of the invention to expect a similar behavior with the

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binding and blowing agent as taught by Matthews in the process of Matsubara, since similar conditions were employed. Furthermore, Matthews teaches a drying step to allow for moisture removal of the precursor. Such a drying step would allow for temporary storage of the precursor until the firing step. It would have been obvious to one of ordinary skill in the art at the time of the invention to have employed the drying step of Matthews in the process of Matsubara as allows for the removal of excess moisture, which would alleviate the energy required in the firing step, since energy can be concentrated more on the glassification, than the combination of drying and glassification.

7. Regarding claim 17, the firing temperature was 1500°C ([0063]).

8. Regarding claim 23, Matthews et al. disclose a drying step to reduce moisture of the precursor (col. 7 lines 49-53) and expansion of the precursor can be attributed to the steam in the feed particle (col. 16 lines 10-11). Matthews et al. also mention that rupturing of the precursor will occur if expansion is too fast or too much (col. 12 lines 63-65). Because water is a major contributor to the expansion of the precursor, too much water would result in excess rupturing. Since Matthews et al. perform a drying step to the precursor to reduce the moisture content, having less water in the precursor would inherently reduce the rupturing of the precursor.

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsubara et al. (2002/0004111), as applied to claim 1 above, in view of Seki et al. (JP Abstract 07024299). Matsubara discloses a fuel fired furnace, but do not disclose using a fluidized bed reactor. Seki et al. teach producing microspheres, wherein the firing

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step is performed in a fluidized bed reactor (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the fluidized bed reactor of the Seki et al. in the process of Matsubara as a known variant for supplying heat to the precursor.

10. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable Matsubara et al. (2002/0004111), as applied to claim 1 above, in further view of Aston et al.

(4,475,936). Matsubara discloses a fuel fired furnace, but do not disclose using a vortex furnace that is fuel fired. Aston et al. teach a vortex furnace (abstract) that is fuel-fired (col. 1 line 52) and is use to fire up glass particulates into spherical shapes (col. 1 lines 13-18). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the fuel-fired vortex furnace of Aston et al. in the process of Matsubara as a known variant for supplying rapid heat of the glass particles.

11. Claims 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsubara et al. (2002/0004111) in view of Matthews et al. (3,838,998), as applied to claims 2 and 9 above, in further view of Veatch et al. (2,978,340). Matsubara and Matthews et al. disclose a process for manufacturing microspheres, but do not disclose a firing period of 0.05 to 20 seconds and activating the blowing agent during the formation of the molten skin. Regarding claim 7, Veatch et al. teach making microspheres by firing the precursor for 2 seconds (col. 4 lines 60-61). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the firing period of Veatch et al. in the process of Matsubara and Matthews et al. to ensure enough time to adequate fuse and expand the particles, as taught by Veatch

et al. Regarding claim 10, Veatch et al. teach of activating the blowing agent during the formation of the molten skin (col. 1 lines 33-37). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the activation step of Veatch et al. in the process of Matsubara and Matthews et al. in order to allow for the expansion of the microsphere.

12. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsubara et al. (2002/0004111) in view of Matthews et al. (3,838,998), as applied to claim 15 above, in further view of Kizilshtein et al. (English translation of SU 1650196 abstract) and Brown et al. (4,235,753). Matsubara and Matthews et al. disclose a process for manufacturing microspheres and provide examples of glass starting materials, binding agent and blowing agent. More specifically, Matsubara teaches natural volcanic glass materials, of which basaltic rocks are commonly from, and silicon carbide as blowing agent ([0036]-[0037]). Kizilshtein et al. also teach of aluminosilicate microspheres, wherein the microspheres are made from fly ash (abstract). Brown et al. teach using sodium hydroxide with aluminosilicate to form zeolites (col. 5 lines 48-60). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the aluminosilicate from fly ash and a hydroxide binding agent as taught by the reference above in the process of Matsubara and Matthews et al. in order to utilize the availability of the fly ash resources and to have a thermally stable binder and allow for access of the gases, as taught by Brown et al. (col. 1 lines 28-31).

13. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsubara et al. (2002/0004111) in view of Matthews et al. (3,838,998), as applied



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to claim 13 above, in further view of Netting (3,888,957). Matsubara and Matthews et al. disclose a process for manufacturing microspheres, but do not disclose a drying temperature of 50°C. Netting teach of two drying steps where hollow spheres are dried at a temperature of about 50°C and then further dried at a raised temperature about 400°C (col. 5 lines 30-31). Netting teach an example where the particle was dried at 100°C and then 300°C, which is interpreted to be about the claimed temperatures, according to specification disclose by the applicant on page 21, [0087]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the drying temperatures of Netting in the process of Matsubara and Matthews et al. in order to remove the proper amount of moisture, as taught by Netting.

14. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsubara et al. (2002/0004111) in view of Matthews et al. (3,838,998) and Veatch (2,978,340). Matsubara disclose a method of forming synthetic microspheres, comprising providing an agglomerate precursor, wherein the agglomerate precursor comprises at least one aluminosilicate material of a pre-selected particle size, a blowing agent configured to release a gas when activated, and a binding agent, such as boric acid ([0033]-[0037], [0043], [0061], [0068], [0075]). Matsubara also disclose firing the precursor at 1550°C sufficient to activate the blowing agent to release gas at a temperature of 1550°C, thereby forming microspheres with an internal void and containing substantially no alkali metal oxide content ([0001]).

15. Matsubara discloses mixing the component with kerosene, but not water.

Matsubara also fails to disclose drying the mixture or a firing time. Matsubara teaches

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using other known glass starting materials such as natural volcanic material ([0036]).

Similarly, Matthews et al. also disclose a process for forming aluminosilicate microspheres comprising forming an agglomerate precursor comprising aluminosilicate glasses (col. 4 line 37) from an alternative source, such as feldspar (another naturally occurring rock). Matthews et al also disclose mixing a primary component, blowing agent, and a binding agent (col. 5 lines 60-68) with water to form a homogenous mixture (col. 7 lines 29-44). Furthermore, Matthews teaches drying the mixture to form agglomerate precursor (col. 7 lines 49-53) and firing the precursor at a temperature greater than 800°C (col. 10 line 24) and time to activate the blowing agent to release gas, thereby forming microspheres with an internal void (col. 10 lines 37-45).

16. Since the precursor of Matsubara and Matthews comprises similar elements such a glass starting material comprising aluminosilicate components, a binder and a blowing agent, and the firing of the precursor to form hollow microspheres, it would have been obvious to one of ordinary skill in the art at the time of the invention to expect a similar behavior with the binding and blowing agent as taught by Matthews in the process of Matsubara, since similar conditions were employed. Furthermore, Matthews teaches a drying step to allow for moisture removal of the precursor. Such a drying step would allow for temporary storage of the precursor until the firing step. It would have been obvious to one of ordinary skill in the art at the time of the invention to have employed the drying step of Matthews in the process of Matsubara as allows for the removal of excess moisture, which would alleviate the energy required in the firing step,

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since energy can be concentrated more on the glassification, than the combination of drying and glassification.

17. Matthews et al. further disclose the firing time as very short (col. 1 lines 4-6), but does not disclose a specific amount of time. Veatch et al. teach a firing time of less than 20 seconds (col. 4 lines 40-41). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the firing time of Veatch et al. in the process Matsubara and Matthews et al. in order to adequately fuse the and expand the hollow spheres.

### ***Response to Arguments***

Applicant's arguments with respect to Budd have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Queenie Dehghan whose telephone number is (571)272-8209. The examiner can normally be reached on Monday through Friday 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Steven P. Griffin/  
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Q Dehghan